

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :
:
Yoshiki NAKAGAWA, *et al.* :
:
Serial No.: To be assigned : Art Unit: To be assigned
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Filed: Herewith : Examiner: To be assigned
:
For: FUNCTIONAL GROUPS- : Atty Docket: 1581/00271
TERMINATED VINYL :
POLYMERS :

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to initial examination, please amend the above-captioned case as follows.

IN THE SPECIFICATION:

Page 1, immediately following the title please insert:

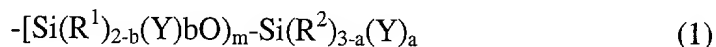
--Cross Reference to Related Applications

This application is a divisional application of our copending application U.S.S.N. 09/122,876 filed July 28, 1998 and entitled Functional Groups-Terminated Vinyl Polymers, which in turn claimed priority under 35 USC 119 from Japanese applications Hei-9-218089, Hei-9-218090, and Hei-9-218091, all filed on July 28, 1997.--

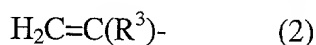
Page 4, kindly replace the paragraph which encompasses line 28 through page 5, line 4 as follows:

The present invention consists in a vinyl polymer which has at least one terminal functional group per molecule and has a ratio of weight average molecular weight to number average molecular weight of less than 1.8 as determined by gel permeation chromatography, said

terminal functional group being a crosslinking silyl group of the general formula (1) shown below, an alkenyl group of the general formula (2) shown below or a hydroxyl group:



wherein R^1 and R^2 each independently represents an alkyl group containing 1 to 20 carbon atom, an aryl group containing 6 to 20 carbon atoms, an aralkyl group containing 7 to 20 carbon atoms or a triorganosiloxy group of the formula $(\text{R}')_3\text{SiO-}$ (R' being a monovalent hydrocarbon residue containing 1 to 20 carbon atoms and the three R' groups being the same or different), provided that when a plurality of R^1 or R^2 groups occur, they may be the same or different; Y represents a hydroxyl group or a hydrolysable group, provided that when a plurality of Y groups occur, they may be the same or different; a represents 0, 1, 2 or 3, b represents 0, 1 or 2, and m represents an integer of 0 to 19, provided that the condition $a + mb \geq 1$ should be satisfied;



wherein R^3 represents a hydrogen atom or a methyl group.

Page 7, kindly amend the paragraph that encompasses line 47 through page 8, line 5 as follows:

Specific examples of R^5 other than a direct bond include, but are not limited to,

$-(\text{CH}_2)_n-$ (n being an integer of 1 to 20),
 $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}(\text{CH}_3)(\text{CH}_2)_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{C}(\text{CH}_3)_2-$, $-(\text{CH}_2)_n\text{-O}-(\text{CH}_2)_m-$ (n and m each independently being an integer of 1 to 20 on condition that $n + m \leq 20$), $o-$, $m-$, $p-\text{C}_6\text{H}_4$, $o-$, $m-$, $p-(\text{CH}_2)_n\text{-C}_6\text{H}_4-(\text{CH}_2)_m-$ (n and m each independently being an integer of 0 to 14 on condition that $n + m \leq 14$), and the like.

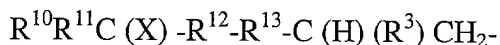
Page 8, kindly replace the paragraph that encompasses line 31 through line 40 as follows:

Specific examples of R^6 other than a direct bond include, but are not limited to,

$-(\text{CH}_2)_n-$ (n being an integer of 1 to 20),
 $-\text{CH}(\text{CH}_3)\text{CH}_2-$, $-\text{CH}(\text{CH}_3)(\text{CH}_2)_2-$, $-\text{CH}_2\text{CH}(\text{CH}_3)-$, $-\text{C}(\text{CH}_3)_2-$, $-(\text{CH}_2)_n\text{-O}-(\text{CH}_2)_m-$ (n and m each independently being an integer of 1 to 20 on condition that $n + m \geq 20$), $-\text{CH}(\text{C}_6\text{H}_5)-$, $-\text{C}(\text{CH}_3)(\text{C}_6\text{H}_5)-$, $o-$, $m-$, $p-\text{C}_6\text{H}_4$, $o-$, $m-$, $p-(\text{CH}_2)_n\text{-C}_6\text{H}_4-(\text{CH}_2)_m-$ (n and m each independently being an integer of 0 to 14 on condition that $n + m \leq 14$), and the like.

Page 17, kindly replace the paragraph encompassing lines 25-42 for the following:

The crosslinking silyl-containing organohalogen compound is not limited to any particular species but includes, among others, compounds having the structure of the general formula (15):



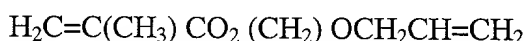
$[Si(R^{15})_{2-b}(Y)_bO]_m-Si(R^{16})_{3-a}(Y)_a$ (15) wherein R^3 , R^{10} , R^{11} , R^{12} , R^{13} and X are as defined above, R^{15} and R^{16} each represents an alkyl, aryl or aralkyl group containing up to 20 carbon atoms or a triorganosiloxy group of the formula $(R')_3SiO-$ (in which R' is a monovalent hydrocarbon group containing 1 to 20 carbon atoms and the three R' groups may be the same or different) and when two or more R^9 or R^{10} groups occur, they may be the same or different; Y represents a hydroxyl group or a hydrolyzable group and when two or more Y groups occur, they may be the same or different; a represents 0, 1, 2 or 3, b represents 0, 1 or 2, and m represents an integer of 0 to 19, provided that the condition $a + mb \geq 1$ should be satisfied.

Page 28, kindly replace the paragraph encompassing lines 8-29 as follows:

A three-necked flask equipped with stirrer, thermometer, reflux condenser and Dean-Stark trap is charged with methacrylic acid (137.7 g, 1.6 mol), ethylene glycol monoallyl ether (80.7 g, 0.8 mol), p-toluenesulfonic acid (0.76 g, 4.0 mmol) and toluene (650 mL). After allowing the reaction to proceed at 120°C for 5 hours, 0.12 g of p-toluenesulfonic acid is added, and the reaction is further allowed to proceed at the same temperature for 6 hours. Then, 0.1 g of p-toluenesulfonic acid is added, and the reaction is further allowed to proceed at the same temperature for 9 hours, whereupon the reaction is completed. During the whole reaction period, methacrylic acid and ethylene glycol monoallyl ether are monitored with liquid chromatography. The final conversion amounted to 98%. The reaction mixture is neutralized by adding an aqueous solution of $NaHCO_3$ and allowed to separate into two layers. The aqueous layer is extracted once with toluene. The combined organic layer is dried over $CaCl_2$ and the volatile matter is distilled off under reduced pressure. The crude product is distilled under reduced pressure (60, 2 mmHg) to give 98.7 g (73% yield) of 2-allyloxyethyl methacrylate shown below.

Page 28, kindly replace the paragraph encompassing lines 34-40 as follows:

To 1/2 N-potassium hydroxide/ethanol (200 mL) is added undecylenic acid (18.8 g, 0.102 mol) slowly dropwise at 0°C with constant stirring. The volatile matter is then distilled off to give a crude product. This crude product is washed with acetone and heated in vacuo to provide potassium undecylenate of the following formula as white solid (8.88 g, yield 88%).



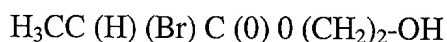
Page 28, kindly replace the paragraph that encompasses lines 45-49 as follows:

Into methanol (245 mL) is added 4-pentenoic acid (49 g, 0.489 mol) and potassium tert-butoxide (54.9 g, 0.489 mol), and the mixture is stirred at 0°C. The volatile matter is then distilled off under reduced pressure to provide potassium 4-pentenoate of the following formula.



Page 29, kindly replace the paragraph that encompasses lines 4-18 as follows:

In a nitrogen atmosphere, 2-bromopropionyl chloride (2 mL, 3.35 g, 19.5 mmol) is added dropwise slowly at 0°C to a THF (tetrahydrofuran) solution (10 mL) of ethylene glycol (10.9 mL, 195 mmol) and pyridine (3 g, 39 mmol). The solution is stirred at that temperature for 2 hours. Dilute hydrochloric acid (20 mL) and ethyl acetate (30 mL) are added and the mixture is allowed to separate into two layers. The organic layer is washed with dilute hydrochloric acid and brine and dried over Na_2SO_4 , and the volatile matter is then distilled off under reduced pressure to give a crude product (3.07 g). This crude product is distilled under reduced pressure (70~73, 0.5 mmHg) to give hydroxyethyl 2-bromopropionate of the formula shown below (2.14 g, 56%):



Page 29, kindly replace the paragraph encompassing lines 22-36 as follows:

A 50-mL two-necked flask is purged with nitrogen and then charged with 2-allyloxyethanol (2.5 mL, 23.4 mmol), pyridine (3 mL) and THF (10 mL). The solution is cooled to 0°C, and 2-bromopropionyl chloride (2 mL, 19.52 mmol) is added dropwise slowly. The resulting mixture is stirred at that temperature for an hour, then ethyl acetate (10 mL) is added, and the resulting pyridine hydrochloride is filtered off. The filtrate is washed with dilute hydrochloric acid (10 mL), then with an aqueous solution of NaHCO_3 (10 mL) and further with

brine (10 mL). The organic layer is dried over Na_2SO_4 and the volatile matter is distilled off under reduced pressure. The crude product thus obtained is distilled under reduced pressure to give allyloxyethyl 2-bromopropionate (78.5-81 (1.3 mmHg), 2.986 g) of the formula shown below.



Page 29, kindly replace the paragraph encompassing line 40 through page 30, line 9 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2' bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 ML) and acetonitrile (20mL). After dissolved oxygen elimination by bubbling with nitrogen, the reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 ML, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110° for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na_2SO_4 , and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 30, kindly replace the paragraph encompassing lines 10-24 as follows:

Then, undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) is added dropwise slowly to a toluene solution (100 mL) of the hydroxyl-terminated poly(n-butyl acrylate) obtained in the above manner (50 g) and pyridine (10 mL) in a nitrogen atmosphere at 75°C, and the mixture is stirred at 75°C for 3 hours. The resulting white precipitate is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na_2SO_4 and concentrated under reduced pressure to give alkenyl-containing poly(n-butyl acrylate) (43 g). The polymer has a number average molecular weight of 5,400 (polystyrene equivalent) as

determined by GPC, with a molecular weight distribution of 1.30. The number of alkenyl groups introduced per oligomer molecule is found to be 2.28 upon ¹H NMR analysis.

Page 30, kindly replace the paragraph encompassing lines 25-40 as follows:

Then, a 30-mL pressure reaction vessel is charged with the thus-obtained poly(butyl acrylate) having alkenyl groups at both ends (2 g), methyldimethoxysilane (0.32 mL), methyl orthoformate (0.09 mL, 3 equivalents relative to the alkenyl group) and platinum(0)-1,1,3,3,-tetramethyl-1,3-divinyldisiloxane complex (8.3×10^{-8} mol/L xylene solution, 10⁴ equivalent relative to the alkenyl group), and the mixture is stirred at 100°C for an hour. The volatile matter is distilled off to give 2 g of poly(n-butyl acrylate) having methyldimethoxysilyl groups at both ends, as represented by the formula shown below. The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.37. The number of silyl groups introduced per oligomer molecule is 2.24 as determined by ¹H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 2-24 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 1 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20mL). After dissolved oxygen elimination by purging with nitrogen, the reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110 for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed with 10% hydrochloric acid and brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of hydroxyl-terminated poly(n-butyl acrylate). The polymer has viscosity of 25 Pa.s. The polymer has a number average molecular weight of 5,100 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29. The average number of hydroxyl groups introduced per polymer molecule is found to be 2.28 upon ¹H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 26-40 as follows:

Undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) is added dropwise slowly to a toluene solution (100 mL) of the hydroxyl-terminated poly(n-butyl acrylate) obtained above (50 g) and pyridine (10 mL) in a nitrogen atmosphere at 75°C, and the mixture is stirred at 75°C for 3 hours. The resulting white precipitate is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give alkenyl-containing poly(n-butyl acrylate) (43 g). The polymer has a number average molecular weight of 5,400 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.30. The number of alkenyl groups introduced per polymer molecule is found to be 2.28 upon ¹H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 43-52, line 7 as follows:

A 30-mL pressure reaction vessel is charged with the thus-obtained poly(butyl acrylate) having alkenyl groups at both ends (2 g), methyldimethoxysilane (0.32 mL), methyl orthoformate (0.09 mL, 3 equivalents relative to the alkenyl group) and platinum bis(divinyltetramethyldisiloxane) (8.3 x 10⁻⁸ mol/L xylene solution, 10⁻⁴ equivalent relative to the alkenyl group), and the mixture is stirred at 100°C for an hour. The volatile matter is distilled off to give 2 g of a crosslinking silyl-containing poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,900 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.37. The number of silyl groups introduced per polymer molecule is 2.24 as determined by ¹H NMR analysis.

Page 32, kindly replace the paragraph encompassing lines 20-31 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 2, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 88% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.32 Mpa and the breaking elongation is 34%.

Page 32, kindly replace the paragraph encompassing lines 35-50 as follows:

A 500-mL pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), dibromoxylene (4.12 g, 15.6 mmol), cuprous bromide (2.45 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20 mL). After dissolved oxygen elimination by bubbling nitrogen gas, the vessel is sealed, and the mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, followed by reaction at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), and passed through an activated alumina column for removing the copper catalyst to give a bromine-terminated polymer. The polymer has a number average molecular weight of 5,700 (mobile phase: chloroform, polystyrene equivalent), with a molecular weight distribution of 1.37.

Page 33, kindly replace the paragraph encompassing lines 21-32 as follows:

A 200-mL pressure reaction vessel is charged with 60 g of the thus-obtained, alkenyl-terminated polymer, 8.4 mL (68.1 mmol) of methyldimethoxysilane, 2.5 mL (22.9 mmol) of methyl orthoformate, and platinum bis(divinyl-tetramethyldisiloxane) (5×10^{-3} mmol). The reaction is allowed to proceed at 100°C for 4 hours to give a crosslinking silyl-having polymer. The polymer has a number average molecular weight of 6,000 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.44. The number of crosslinking silyl groups per polymer molecule is 1.59 as determined by ^1H NMR analysis.

Page 33, kindly replace the paragraph encompassing line 50 through page 34, line 10 as follows:

A 500-mL flask is charged with cuprous bromide (0.63 g, 4.4-mmol), pentamethyldiehtylenetriamine (0.76 g, 4.4 mmol), acetonitrile (5 mL), diethyl 2,5-dibromoadipate (1.6 g, 4.4 mmol), and butyl acrylate (44.7 g, 349 mmol). After carrying out freeze degassing, the reaction is allowed to proceed at 70°C for 7 hours in a nitrogen atmosphere. The mixture is passed through an activated alumina column for removing copper catalyst to

obtain a bromine-terminated polymer. The polymer obtained has a number average molecular weight of 10,700, and a molecular weight distribution of 1.15.

Page 34, kindly replace the paragraph encompassing lines 12-24 as follows:

In a nitrogen atmosphere, a 200-mL flask is charged with 35 g of the halogen-terminated poly(n-butyl acrylate) obtained above, 2.2 g (16.1 mmol) of potassium pentenoate, and 35 mL of DMAc. The reaction is allowed to proceed at 70°C for 4 hours. Potassium pentenoate unreacted and potassium bromide formed in the reaction mixture is removed by water extraction to obtain an alkenyl-terminated polymer. The polymer obtained has a number average molecular weight of 11,300 as determined with GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.12. The number of alkenyl groups per polymer molecule is 1.82 as determined by ¹H NMR analysis.

Page 33, kindly replace the paragraph encompassing lines 35-46 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 3, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 2 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 93% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.26 Mpa and the breaking elongation is 75%.

Page 34, kindly replace the paragraph that encompasses line 42 through page 35, line 3 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 4, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 98% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.35 Mpa and the breaking elongation is 77%.

Page 35, kindly replace the paragraph that encompasses lines 7-28 as follows:

A 100-mL glass reaction vessel is charged with butyl acrylate (50.0 mL, 44.7 g, 0.349 mol), cuprous bromide (1.25 g, 8.72 mmol), pentamethyldiethylenetriamine (1.82 mL, 1.51 g, 8.72 mmol), and acetonitrile (5 mL). After cooling and degassed under reduced pressures, the inside of the reaction vessel is purged with nitrogen gas. After stirring thoroughly, diethyl 2,5-dibromoadipate (1.57 g, 4.36 mmol) is added and the mixture is stirred and heated at 70°C. After 60 minutes, 1,7-octadiene (6.44 mL, 4.80 g, 43.6 mmol) is added to this mixture and heating is continued at 70°C for 2 hours with stirring. The reaction mixture is treated with activated alumina and the volatile matter is distilled off by heating under reduced pressures. The residue is dissolved into ethyl acetate, and washed with 2% hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and the volatile matter is distilled off by heating under reduced pressures to give an alkenyl-terminated polymer. The polymer has a number average molecular weight of 13,100 as determined by GPC (polystyrene equivalent), with a molecular weight distribution of 1.22. The number of alkenyl groups per polymer molecule is 2.01 as determined by ¹H NMR analysis.

Page 35, kindly replace the paragraph encompassing lines 31-37 as follows:

The alkenyl-terminated poly(n-butyl acrylate) obtained above (3.05 g) and the same weight of aluminum silicate (Kyowa Chemical's Kyowaad 700PEL) are mixed with toluene, and stirred at 100°C. After 4 hours, aluminum silicate is filtered off and the volatile matter of the filtrate is distilled off by heating under reduced pressures to purify the polymer.

Page 36, kindly replace the paragraph encompassing line 5-16 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 5, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 85% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.34 Mpa and the breaking elongation is 86%.

Page 36, kindly replace the paragraph encompassing lines 20-31 as follows:

A 500-mL flask is charged with cuprous bromide (0.63 g, 4.4 mmol), pentamethyldiethylenetriamine (0.76 g, 4.4 mmol), acetonitrile (5 mL), diethyl 2,5-dibromoadipate (0.78 g, 2.2 mmol), and butyl acrylate (44.7 g, 349 mmol). After carrying out freeze degassing, the reaction is allowed to proceed at 70°C for 6 hours in a nitrogen atmosphere. The mixture is passed through an activated alumina column for removing copper catalyst to obtain a bromine-terminated polymer. The polymer obtained has a number average molecular weight of 23,600 as determined by GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.14.

Page 36, kindly replace the paragraph encompassing lines 33-50 as follows:

In a nitrogen atmosphere, a 200-mL flask is charged with 34 g of the bromine-terminated polymer obtained above, 1.0 g (7.6 mmol) of potassium pentenoate; and 34 mL of DMAc. The reaction is allowed to proceed at 70°C for 4 hours. Potassium pentenoate unreacted and potassium bromide formed in the reaction mixture is removed by water extraction to obtain an alkenyl-terminated polymer. This alkenyl-terminated polymer and the same weight (30.5 g) of aluminum silicate (Kyowa Chemical's Kyowaad 700PEL) is mixed with toluene, and stirred at 100°C. After 4 hours, aluminum silicate is filtered off and the volatile matter of the filtrate is distilled off by heating under reduced pressures to purify the polymer. The polymer obtained has a number average molecular weight of 24,800 as determined with GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.14. The number of alkenyl groups per polymer molecule is 1.46 as determined by ¹H NMR analysis.

Page 37, kindly replace the paragraph that encompasses lines 2-14 as follows:

A 200-mL pressure reaction vessel is charged with 21 g of the thus-obtained, alkenyl-terminated polymer, 0.94 mL (7.6 mmol) of methyltrimethoxysilane, 0.13 mL (1.3 mmol) of methyl orthoformate, and platinum bis(divinyl-tetramethyldisiloxane) (2×10^{-4} mmol). The reaction is allowed to proceed at 100°C for 4 hours to give a crosslinking silyl-terminated polymer. The viscosity of the polymer obtained is 100 Pa.s. The polymer has a number average molecular weight of 25,400 (mobile phase: chloroform, polystyrene equivalent) as determined by

GPC, with a molecular weight distribution of 1.16. The number of crosslinking silyl groups per polymer molecule is 1.48 as determined by ^1H NMR analysis.

Page 37, kindly replace the paragraph encompassing lines 17-28 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 6, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 2 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 94% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.40 Mpa and the breaking elongation is 323%.

Page 37, kindly replace the paragraph encompassing line 46 through page 38, line 6 as follows:

One hundred parts by weight of the crosslinking silyl-having polymer as obtained in Comparative Example 1, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 78% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.14 Mpa and the breaking elongation is 69%.

Page 38, kindly replace the paragraph encompassing lines 11-20 as follows:

In one-liter flask, 210 g of toluene, 293 g of butyl acrylate, 7.2 g of methyldimethoxysilylpropyl methacrylate, and 1.8 g of azobisisovaleronitrile are polymerized at 105°C for 7 hours with nitrogen bubbling. Toluene is distilled off to give a crosslinking silyl-having poly(n-butyl acrylate). The viscosity of the polymer obtained is 110 Pa.s. The polymer has a number average molecular weight of 9,600 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 2.86.

Page 40, kindly replace the paragraph encompassing lines 39-43 as follows:

A portion of the cured sheet of crosslinking silyl-containing poly(n-butyl acrylate) as obtained in Reference Example 4 was placed in an oven maintained at 150°C and taken out after 24 hours for observation of the surface state. The surface showed no abnormalities.

Page 40, kindly replace the paragraph encompassing line 48 through page 41, line 14 as follows:

A 200-ml flask was charged with 97 g of vinyl-terminated polydimethylsiloxane (DMS-V25, product of Adimax; unsaturated group equivalent 0.11 eq/kg), 2.3 g (21.4 mmol) of methyldimethoxysilane and 10^{-3} mmol of platinum bis (divinyltetramethyldisiloxane), and the reaction was allowed to proceed at 70°C for 6 hours. The thus-obtained crosslinking silyl-terminated polydimethylsiloxane had a number average molecular weight of 11,900 as determined by GPC (mobile phase chloroform, polystyrene equivalent) with a molecular weight distribution of 2.52. In ^1H -NMR analysis (300 MHz), the unsaturated group-due peak was found disappeared and the number of crosslinking silyl groups per polydimethylsiloxane polymer molecule was 2 as determined based on the intensity ratio between the methyl protons bound to the silicon atoms originating from the main chain of the polymer and the protons of the methoxysilyl groups. The viscosity was 6 poises.

Page 41, kindly replace the paragraph encompassing lines 18- 27 as follows:

The crosslinking silyl-containing polymer of Comparative Example 3 (100 weight parts) was admixed with 1 weight part of water and 1 weight part of dibutyltin dimethoxide and, after thorough stirring, the mixture was poured into a mold with a thickness of 2 mm. After deforming under reduced pressure, thermal curing was effected at 50°C for 10 days. A portion of the cured sheet obtained was placed in an oven at 150°C and taken out after 24 hours for observation of the surface state. The surface showed no abnormalities.

Page 41, kindly replace the paragraph encompassing line 48 to page 42, line 4 as follows:

A 200-g portion of the allyl-terminated polymer obtained in the above manner was heated to about 75°C, then 1.5 eq/vinyl group of methyldimethoxysilane and 5×10 eq/vinyl

group of platinum-vinylsiloxane complex were added and the hydrosilylation reaction was carried out. The reaction was monitored by FT-IR analysis. In about 20 hours, the olefin absorption at 1640 cm⁻¹ disappeared.

Page 42, kindly replace the paragraph encompassing lines 14-23 as follows:

The crosslinking silyl-terminated polymer of Comparative Example 4 (100 weight parts) was admixed with weight part of water and 1 weight part of dibutyltin dimethoxide and, after thorough stirring, the mixture was poured into a mold with a thickness of 2 mm. After deforming under reduced pressure, thermal curing was effected at 50°C for 10 days. A portion of the cured sheet obtained was placed in an oven at 150°C and taken out after 24 hours for observation of the surface state. The surface was found melted, partly with exudation of a liquid.

Page 43, kindly replace the paragraph encompassing lines 27- 38 as follows:

The crosslinking silyl-containing polymer (100 weight parts) obtained in Example 5 was dehydrated azeotropically with toluene. Then, in a nitrogen atmosphere, 1 weight part of methyltrimethoxysilane and 1 weight part of dibutyltin diacetylacetonate were added in sequence, and the mixture was stored in a tightly stoppered sample bottle. The thus-prepared one-pack composition was stored in a constant-temperature, constant-humidity room (23°C, 60% RH) for a week and then discharged into a sample tube. At 24 hours after discharge, the cured portion was taken out and the thickness thereof in the direction of depth was measured and found to be 3 mm.

Page 45, kindly replace the paragraph encompassing line 47 through page 46 line 17 as follows:

A 30-mL glass pressure reaction vessel is charged with butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α , α' - dibromo-p-xylene (185 mg, 0.70 mmol), cuprous bromide (100 mg, 0.70 mmol), 2,2'-bipyridyl (217 mg, 1.40 mmol), ethyl acetate (4 mL) and acetonitrile (one mL). After dissolved oxygen elimination by bubbling nitrogen gas for 10 minutes, the vessel is sealed, and the mixture is heated at 130 for 2 hours to allow the reaction to proceed. After cooling the mixture, methyl-dimethoxysilylpropyl methacrylate (650 mg, 2.8 mmol) is added and the reaction is allowed to proceed at 100°C for 2 hours. After cooling, the mixture is diluted with

ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with ammonium chloride and once with brine. The organic layer is dried over Na_2SO_4 and the volatile matter is distilled off under reduced pressure to give 4.78 g (90%) of methylmethoxysilyl-terminated poly(butyl acrylate). The polymer has a number average molecular weight of 7,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.74. The number of silyl groups introduced per polymer molecule is 3.2 as determined by ^1H NMR analysis.

Page 46, kindly replace the paragraph encompassing lines 20- 40 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (89.6 mL) and acetonitrile (22.4 mL) and, after dissolved oxygen elimination by blowing with nitrogen gas for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for one hour to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for one hour. The reaction mixture is diluted with ethyl acetate, the insoluble matter is filtered off, and the filtrate is washed three times with 10% -hydrochloric acid and once with brine. The organic layer is dried over Na_2SO_4 , and the solvent is distilled off under reduced pressures to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.35.

Page 46, kindly replace the paragraph encompassing line 41 through page 47, line 5 as follows:

Then, to a toluene solution (100 mL) of the thus obtained, hydroxyl-terminated poly(n-butyl acrylate) (68 g) and pyridine (14 mL) is added dropwise slowly undecenoyl chloride (7.1 mL, 33.0 mmol) in a nitrogen atmosphere at 75°C . The reaction is allowed to proceed at 60°C . The resulting white solid is filtered off. The organic layer is washed with dilute hydrochloric acid and brine, and dried over Na_2SO_4 and concentrated under reduced pressures to give an alkenyl-terminated poly(n-butyl acrylate) (64 g). To a toluene solution of the polymer is

added aluminum silicate (Kyowa Chemical's Kyowaad 700PEL). The solution is stirred at the refluxing temperature to thereby remove the trace impurities in the polymer. The number of alkenyl groups introduced per oligomer molecule is 2.8 as determined by ¹H NMR analysis.

Page 47, kindly replace the paragraph encompassing lines 33- 39 as follows:

The thus-obtained composition is cast into a mold, and defoamed under reduced pressures. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. This cured product is immersed in toluene for 24 hours and the gel fraction is determined from the weight change after and before immersion. The gel fraction is 88%.

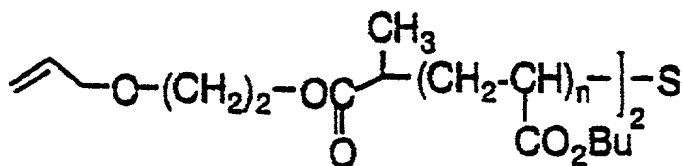
Page 49, kindly replace the paragraph encompassing line 5 through page 50 line 16 as follows:

A 30-ml glass pressure reaction vessel is charged with butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α , α' - dibromo-p-xylene (180 mg, 0.69 mmol), cuprous bromide (98 mg, 0.69 mmol), 2,2'-bipyridyl (319 mg, 2.06 mmol), ethyl acetate (4 mL) and acetonitrile (1 mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the vessel is sealed. The reaction mixture is heated at 130°C for an hour to allow the reaction to proceed. After cooling the mixture, allyltributyltin (0.51 mL, 1.64 mmol) is added in a nitrogen atmosphere and the reaction is allowed to proceed at 100°C for an hour. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give a mixture of poly(butyl acrylate) having alkenyl groups at both ends, as represented by the formula shown below, and bromotributyltin (4.48 g yield). The polymer has a number average molecular weight of 6,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.57. The number of alkenyl groups introduced per oligomer molecule is 2.2 as determined by ¹H NMR analysis.

Page 50, kindly replace the paragraph encompassing lines 21-41 as follows:

A 30-mL glass pressure reaction vessel is charged with butyl acrylate (2.5 mL, 2.24 g, 17.45 mmol), the alkenyl-containing initiator obtained in Production Example 5 (165 mg, 0.698

mmol), cuprous bromide (100 mg, 0.698 mmol), 2,2'-bipyridyl (218 mg, 1.40 mmol), acetonitrile (0.5 mL) and ethyl acetate (2 mL) and, after dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for 50 minutes to allow the reaction to proceed. After cooling to room temperature, the reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give 1.90 g (79%) of poly(butyl acrylate) having an alkenyl group at one end and bromine at the other end. The polymer has a number average molecular weight of 3,600 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.51. The number of alkenyl groups introduced per oligomer molecule is 0.75 as determined by ¹H NMR analysis.



Page 50, kindly delete the extraneous material at the bottom of the page below the page number.

Page 51, kindly replace the paragraph encompassing lines 17-37 as follows:

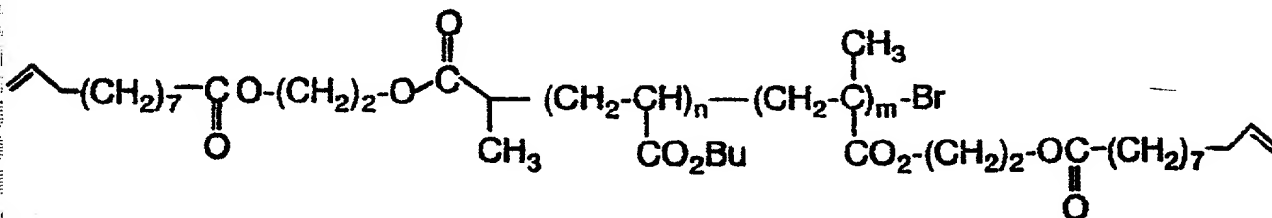
A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2' bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular

weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 51, kindly replace the paragraph encompassing line 38 through page 52, line 3 as follows:

Then, to a toluene solution (100 mL) of the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (50 g) and pyridine (10 mL) is added dropwise slowly undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) in a nitrogen atmosphere at 75. The resulting mixture is stirred at 75°C for 3 hours. The resulting white solid is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) (43 g) of the formula given below. The polymer has a number average molecular weight of 5,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.30.

The number of alkenyl groups introduced per oligomer



molecule is 2.28 as determined by ¹H NMR analysis.

Page 52, kindly replace the paragraph encompassing line 6 through page 53, line 17 as follows:

Poly(n-butyl acrylate) having hydroxyl groups at both ends is synthesized according to Production Example 3 of Japanese Kokai Publication Hei-06-211922. Thus, a 100-mL three-necked flask equipped with magnetic stirrer and dropping funnel is charged with 2-hydroxyethyl disulfide (30.8 g, 24.4 mL, 0.2 mol). The flask is heated to 100, and the mixture of n-butyl acrylate (12.8 g, 14.32 mL, 0.1 mol) and AIBN (azobisisobutyronitrile) (0.328 g, 0.002 mol) is added dropwise over 30 minutes. The resulting mixture is further stirred at 100°C for an hour. Toluene (20 mL) is then added, the mixture is allowed to stand in a separating funnel, and the lower layer is separated. The upper layer is washed three times with water and dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give poly(n-butyl acrylate) having hydroxyl groups at both ends (12.18 g, 95%). The polymer has a

number average molecular weight of 4,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.22.

Page 53, kindly replace the paragraph encompassing lines 18-31 as follows:

Then, to a toluene solution (15 mL) containing the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (10.51 g) and pyridine (2 mL) is added dropwise slowly undecenoyl chloride (0.898 mL, 848 mg, 4.18 mmol) in a nitrogen atmosphere at 60°C, and the resulting mixture is stirred at 60°C for 3 hours. The resulting white solid is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) of the formula shown below (7.45 g). The polymer has a number average molecular weight of 4,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.31.

Page 55, kindly replace the paragraph encompassing lines 10-27 as follows:

In a 500-mL three-necked flask equipped with a reflux condenser, n-butyl acrylate (300 mL) is polymerized at 70°C in an nitrogen atmosphere using a catalyst cuprous bromide (1.50 g, 10.5 mmol), a ligand pentamethyldiethylenetriamine (1.65 mL), a initiator diethyl 2,5-dibromoadipate (9.42 g, 26.2 mmol), and a solvent acetonitrile (30 mL). When the polymerization rate of n-butyl acrylate is 93%, 1,7-octadiene (38.6 mL, 0.261 mol) is added. The mixture is heated at the same temperature, and then is diluted with ethyl acetate. The solution is passed through an activated alumina column for removing the catalyst. Its volatile matter is distilled off to give an alkenyl-terminated polymer. The polymer has a number average molecular weight of 13,800 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.28. The number of alkenyl groups introduced per oligomer molecule is 1.84 upon ¹H NMR analysis.

Page 55, kindly replace the paragraph encompassing lines 30-47 as follows:

A 30-mL glass pressure reaction vessel is charged with n-butyl acrylate (7.5 mL, 6.72 g, 51.3 mmol), α, α'-dibromo-p-xylene (270 mg, 1.03 mmol), cuprous bromide (150 mg, 1.03 mmol), 2,2'-bipyridyl (323 mg, 2.06 mmol), ethyl acetate (6 mL) and acetonitrile (1.5 mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the reaction vessel is

sealed. The mixture is heated at 130°C for 1.5 hours to allow the reaction to proceed. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressures to give 5.0 g (75% polymerization yield) of a halogen-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,600 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.32.

Page 55, kindly replace the paragraph encompassing line 48 through page 56 line 8 as follows:

In a nitrogen atmosphere, the above polymer (5.00 g), potassium undecylenate synthesized in Production Example 2 (476 mg, 2.14 mmol), and dimethylacetamide (10 mL) are allowed to react at 70°C for 6 hours. The volatile matter of the mixture is distilled off under reduced pressures, and after adding ethyl acetate, the insoluble matter is filtered off. The volatile matter of the filtrate is distilled off under reduced pressures to give 4.77 g of an alkenyl-terminated poly(n-butyl acrylate). The number of alkenyl groups introduced per oligomer molecule is 1.70 upon ¹H NMR analysis.

Page 56, kindly replace the paragraph encompassing lines 11-20 as follows:

In the same manner as in Example 15, n-butyl acrylate (300 mL) is polymerized at 70°C in an nitrogen atmosphere using a catalyst cuprous bromide (1.50 g, 10.5 mmol), a ligand pentamethyldiethylenetriamine (0.69 mL), a initiator diethyl 2,5-dibromoadipate (9.42 g, 26.2 mmol), and a solvent acetonitrile (30mL), to thereby give an halogen-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 11,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.16.

Page 56, kindly replace the paragraph encompassing lines 28- 50 as follows:

A 30-mL glass pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α, α'-dibromo-p-xylene (180 mg, 0.69 mmol), cuprous bromide (98 mg, 0.69 mmol), 2,2'-bipyridyl (319 mg, 2.06 mmol), ethyl acetate (4 mL) and acetonitrile (one mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the reaction vessel is

sealed. The mixture is heated at 130°C for one hour to allow the reaction to proceed. After cooling the mixture, allyltributyltin (0.51 mL, 1.64 mmol) is added in a nitrogen atmosphere and the reaction is allowed to proceed at 100°C for one hour. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressures to give a mixture of an alkenyl-terminated poly(n-butyl acrylate) and bromotributyltin (4.48 g yield). The polymer has a number average molecular weight of 6,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.57. The number of alkenyl groups introduced per oligomer molecule is found to be 2.2 upon ¹H NMR analysis.

Page 57, kindly replace the paragraph encompassing lines 2-24 as follows:

A 30-mL glass pressure reaction vessel is charged with methyl acrylate (5 mL, 4.78 g, 55.5 mmol), allyl 2-methyl-2-bromopropionate (0.354 mL, 460 mg, 2.22 mmol), cuprous bromide (318 mg, 2.22 mmol), 2,2'-bipyridyl (1.04 g, 6.66 mmol), acetonitrile (one mL), and ethyl acetate (4 mL). After dissolved oxygen elimination by carrying out vacuum degassing three times, the reaction vessel is sealed. The mixture is heated at 80°C for 3 hours to allow the reaction to proceed. After cooling the mixture to the room temperature, the reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressures to give 3.93 g (75%) of a poly(methyl acrylate) having an alkenyl group at one end and bromine at the other end. The polymer has a number average molecular weight of 2,700 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.48. The number of alkenyl groups introduced per oligomer molecule is 0.81 upon ¹H NMR analysis.

Page 57, kindly replace the paragraph beginning at line 41 through page 58 at line 11 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL)

and acetonitrile (22 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g; 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 58, kindly replace the paragraph encompassing lines 12-21 as follows:

Then, to a toluene solution (100 mL) of the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (50 g) and pyridine (10 mL) is added dropwise slowly undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) in a nitrogen atmosphere at 75. The resulting mixture is stirred at 75°C for 3 hours. The resulting white solid is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) (43 g).

Page 58, kindly replace the paragraph encompassing lines 43 through page 59 line 2 as follows:

A portion of each composition thus obtained is subjected to curing testing on a hot plate at 130°C and the gel time is measured. The remaining portion of the composition is degassed under reduced pressure and then poured into a mold and cured by heating at 100°C to give a rubber-like cured product. The cured product is immersed in toluene for 24 hours. The weights before and after immersion are measured and the gel fraction is determined based on the change in weight. The results thus obtained are shown in Table 4.

Page 60, kindly replace the paragraph encompassing line 11 through page 61 line 20 as follows:

A 30-mL pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), the hydroxyl-containing initiator obtained in Production Example 4 (138 mg, 0.698 mmol), cuprous bromide (100 mg, 0.698 mmol), 2,2'-bipyridyl (218 mg, 1.40 mmol), ethyl acetate (4 mL) and acetonitrile (one mL), and after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130° for 2 hours to allow the reaction to proceed. The reaction vessel is then cooled to room temperature, 2-hydroxyethyl methacrylate (0.176 mL, 182 mg, 1.40 mmol) is added, and the reaction is allowed to proceed at 100°C for 2 hours.. The reaction mixture is diluted with ethyl acetate (20 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 4.44 g (93% yield) of an hydroxyl-terminated poly(n-butyl acrylate) having the formula shown below. The polymer has a number average molecular weight of 6,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.32. The number of hydroxyl groups per polymer molecule is on average 3.3 as determined by NMR measurement. The viscosity of this polymer as determined by using an E type viscometer (shear rate: 10 sec⁻¹, 23) is 388 poises.

Page 61, kindly replace the paragraph encompassing line 25 through page 62, line 3 as follows:

Poly(n-butyl acrylate) having hydroxyl groups at both ends is synthesized according to Example 1 of Japanese Kokai Publication Hei-05-262808. Thus, a 100-mL three-necked flask equipped with magnetic stirrer and dropping funnel is charged with 2-hydroxyethyl disulfide (30.8 g, 24.4 mL, 0.2 mol). The flask is heated to 100°C, and a mixture of n-butyl acrylate (12.8 g, 14.32 mL, 0.1 mol) and AIBN (0.328 g, 0.002 mol) is added dropwise over 30 minutes. The mixture is further stirred at 100°C for an hour. Toluene (20 mL) is then added, the mixture is allowed to stand in a separating funnel, and the lower layer is separated. The upper layer is washed three times with water and dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give a poly(n-butyl acrylate) having hydroxyl groups at both ends (12.18 g, 95%). The polymer has a number average molecular weight of 4,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.22. The viscosity of this polymer as determined by using an E type iscometer (shear rate: 10 sec⁻¹, 23) is 490 poises.

The average number of hydroxyl group per polymer molecule is 1.42 as determined by ¹H NMR analysis.

Page 63, kindly replace the paragraph that encompasses line 13 through page 64, line 6 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20mL). After dissolved oxygen elimination by bubbling with nitrogen, the reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed with log hydrochloric acid and with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 25 Pa.s. The polymer has a number average molecular weight of 5,100 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29. Its ¹H NMR analysis showed that the polymer contained, on an average, 2.39 hydroxyl groups per molecule.

Page 64, kindly replace the paragraph encompassing lines 9-25 as follows:

The hydroxyl-terminated poly(n-butyl acrylate) obtained above (4.94 g, OH = 2.30 mmol) is dehydrated by azeotropy at 50 in the presence of toluene. To this are added tin octynate (4.9 mg) and toluene (6 mL), and then methyldimethoxysilylpropyl isocyanate (0.524 g, 2.77 mmol) is added dropwise at 50°C. After completion of addition, the reaction temperature is raised to 70°C, with continuing reaction for 4 hours. It is concluded that there are no hydroxyl groups unreacted because the signal (3.8 ppm) of methylene group bound to hydroxyl group is disappeared in ¹H NMR. The volatile matter is distilled off under reduced pressures to give a crosslinking silyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 22 Pa.s. The

polymer has a number average molecular weight of 4,900 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.60.

Page 64, kindly replace the paragraph encompassing lines 28-34 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 21 is mixed with one part by weight of dibutyltin diacetylacetonate, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 93% as obtained by toluene extraction.

Page 64, kindly replace the paragraph encompassing line 43 through page 65 line 9 as follows:

The hydroxyl-terminated poly(n-butyl acrylate) obtained in Comparative Example 6 (4.52 g, OH = 1.85 mmol) is dehydrated by azeotropy at 50°C in the presence of toluene. To this are added tin octynate (4.52 mg) and toluene (6 mL), and then methyltrimethoxysilylpropyl isocyanate (0.421 g, 2.22 mmol) is added dropwise at 50°C. After completion of adding, the reaction temperature is raised to 70°C, with continuing reaction for 4 hours. It is included that there are no hydroxyl groups unreacted because the signal (3.8 ppm) of methylene group bound to hydroxyl group is disappeared in ¹H NMR. The volatile matter is distilled off under reduced pressures to give a crosslinking silyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 53 Pa.s. The polymer has a number average molecular weight of 4,700 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 3.71.

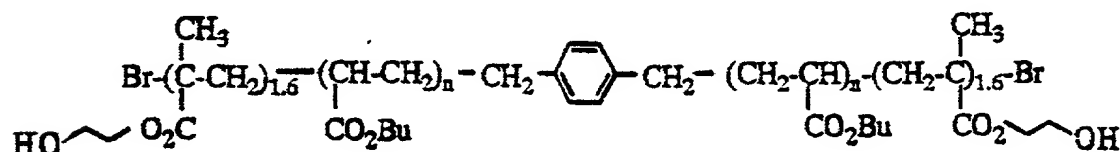
Page 65, kindly replace the paragraph encompassing lines 12-20 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Comparative Example 7 is mixed with one part by weight of dibutyltin diacetylacetonate, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 82% as obtained by toluene extraction. The extract is concentrated to measure ¹H NMR, but there are no crosslinking silyl groups.

Page 65, kindly replace the paragraph encompassing lines 27-49 as follows:

A 30-mL pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α - α' -dibromo-p-xylene (185 mg, 0.70 mmol), cuprous bromide (100 mg, 0.70 mmol), 2,2'-bipyridyl (326 mg, 2.10 mmol), ethyl acetate (4 mL) and acetonitrile (one mL) and, after dissolved oxygen elimination by bubbling with nitrogen for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for 3 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (0.352 mL, 364 mg, 2.80 mmol) is added and, after sealing, the reaction is allowed to proceed at 80°C for 2 hours. The reaction mixture is diluted with ethyl acetate (20 mL), and the filtrate is washed with three portions of 10% hydrochloric acid and with one portion of brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 4.11 g (82%) of a hydroxyl-terminated poly(n-butyl acrylate) having the formula shown below. The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.45. Its ¹H NMR analysis showed that the polymer contained, on an average, 3.2 hydroxyl groups per molecule.

Page 65, after line 50, kindly insert the following:



Page 65, kindly delete the extraneous material at the bottom of the page below the page number.

Page 66, kindly replace the paragraph encompassing lines 24-43 as follows:

A 50-mL pressure reaction vessel is charged with n-butyl acrylate (10.94 mL, 9.78 g, 76.3 mmol), the hydroxyl containing initiator obtained in Production Example 4 (301 mg, 1.53 mmol), cuprous bromide (219 mg, 1.53 mmol), 2,2'-bipyridyl (476 mg, 3.05 mmol), ethyl acetate (8.8 mL) and acetonitrile (2.2 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 1.3 hours to allow the reaction to proceed. The reaction mixture is diluted with ethyl acetate (20 mL), and the filtrate is washed three times with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 5.23 g (53%) of a poly(n-butyl acrylate) having a hydroxyl group at one end. The polymer has a number average molecular weight of 3,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.31. Its 1H NMR analysis showed that the polymer contained, on an average, 1.09 hydroxyl groups per molecule.

Page 67, kindly replace the paragraph encompassing lines 23-29 as follows:

Each mixture is degassed under reduced pressure, then poured into a mold, and cured by heating at 80°C for 15 hours. A portion of the cured product obtained is immersed in toluene for 24 hours. The weights before and after immersion are measured and the gel fraction is determined based on the change in weight. The results thus obtained are shown in Table 7.

Page 68, kindly replace the paragraph encompassing lines 5-18 as follows:

A 100-mL reactor is charged with n-butyl acrylate (20 mL, 1.79 g, 0.140 mmol), diethyl 2,5-dibromoadipate (0.628 g, 1.74 mmol), cuprous bromide (225 mg, 1.57 mmol), pentamethyldiethylenetriamine (0.328 mL, 0.272 g, 1.57 mmol), and toluene (2.0 mL). After carrying out freeze degassing, the reactor is purged with nitrogen. The mixture is heated at 70°C to allow the reaction to proceed for 45 minutes. At this time, the conversion rate of the monomer is 82%. The reaction mixture is diluted with ethyl acetate, and then the solution is passed through an activated alumina column for removing copper catalyst to obtain a bromine-terminated poly(n-butyl acrylate). The polymer obtained has a number average molecular weight of 10,200 and a molecular weight distribution of 1.44.

Page 68, kindly replace the paragraph encompassing lines 19-27 as follows:

In N,N-dimethylacetamide (10 mL) are mixed the poly(n-butyl acrylate) obtained (5.00 g) and sodium 4-hydroxybutanoate, and the solution is stirred at 70°C for 3 hours. The reaction solution is diluted with ethyl acetate and washed with water. The volatile matter of the organic layer is distilled off under reduced pressures to obtain the polymer having hydroxyl groups at both ends. Its ¹H NMR analysis showed that the polymer contained, on an average, 1.66 hydroxyl groups per molecule.

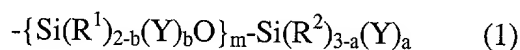
Page 68, kindly replace the paragraph encompassing lines 30-40 as follows:

The poly(n-butyl acrylate) having hydroxyl groups at both ends as obtained in Example 26 is thoroughly mixed with a trifunctional isocyanate compound (Ipposha Yushi's B-45). The mixing ratio is such that the mole ratio between the hydroxyl group of the polymer and the isocyanate of the isocyanate compound amounted to 1/3. This mixture is degassed under reduced pressure, and cured by heating at 100°C for 24 hours. A portion of the cured product obtained is immersed in toluene for 24 hours. The gel fraction is 97% as determined based on the change in weight before and after immersion.

IN THE CLAIMS

Please withdraw claims 1-12 without prejudice to their reentry at some later date and add the following claims:

--13. (New) A vinyl polymer which has at least one terminal function group per molecule and has a ratio of weight average molecular weight to number average molecular weight of less than 1.8 as determined by gel permeation chromatography, said terminal function group being a crosslinking silyl group of the general formula (1) shown below, or a hydroxyl group.



wherein R¹ and R² each independently represents an alkyl group containing 1 to 20 carbon atoms, an aryl group containing 6 to 20 carbon atoms, an aralkyl group containing 7 to 20 carbon atoms, or

a triorganosiloxy group of the formula $(R')_3SiO-$ R' being a monovalent hydrocarbon residue containing 1 to 20 carbon atoms and the three R' groups being the same or different, provided that when a plurality of R^1 or R^2 groups occur, they may be the same or different; Y represents a hydroxyl group or a hydrolysable group, provided that when a plurality of Y groups occur, they may be the same or different; a represents 0, 1, 2 or 3, b represents 0, 1 or 2, and m represents an integer of 0 to 19, provided that the condition $a + mb \geq 1$ should be satisfied.

--14. (New) The vinyl polymer according to claim 13, wherein the ratio of weight average molecular weight to number average molecular weight as determined by gel permeation chromatography is not more than 1.7.

--15. (New) The vinyl polymer according to claim 13, wherein the ratio of weight average molecular weight to number average molecular weight as determined by gel permeation chromatography is not more than 1.6.

--16. (New) The vinyl polymer according to claim 13 wherein the ratio of weight average molecular weight to number average molecular weight as determined by gel permeation chromatography is not more than 1.5.

--17. (New) The polymer according to claim 13, wherein its main chain is a (meth)acrylic polymer.

--18. (New) The polymer according to claim 17, wherein the main chain is an acrylate ester polymer.

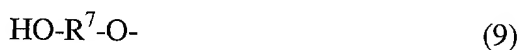
--19. (New) The polymer according to claim 13, wherein the main chain is produced by atom transfer radical polymerization.

--20. (New) The polymer according to claim 13 as produced by converting a terminal halogen group of the halogen-terminated vinyl polymer to a crosslinking silyl-containing substituent, an alkenyl-containing substituent, or a hydroxyl-containing substituent.

--21. (New) The crosslinking silyl-terminated vinyl polymer according to claim 12, wherein Y in general formula (1) is a hydrogen atom, a halogen atom, a hydroxyl, alkoxyl, acyloxyl, ketoximate, amino, amido, aminoxyl, mercapto or alkenyloxyl group, provided that when a plurality of Y groups occur, they may be the same or different with each other.

--22. (New) The vinyl polymer according to claim 21, wherein Y in general formula (1) is an alkoxyl group.

--23. (New) The polymer according to claim 13, wherein its main chain has at least one hydroxyl group bonded thereto in a form represented by one of the general formulas (8) to (12).



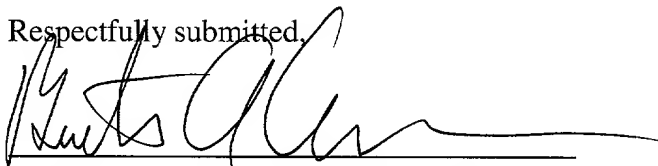
wherein R^6 represents a direct bond, or an alkylene group containing 1 to 20 carbon atoms, an arylene group containing 6 to 20 carbon atoms or an aralkylene group containing 7 to 20 carbon atoms, which may contain one or more ether bonds; and R^7 represents an alkylene group containing 1 to 20 carbon atoms, an arylene group containing 6 to 20 carbon atoms or an aralkylene group containing 7 to 20 carbon atoms, and may contain one or more ether bonds/

REMARKS

The specification and claims have been amended to correct errors which occurred during the transmission of this application via electronic mail and to correct a clerical error. Also, claims 1-12 have been replaced with claims 13-23, wherein the alkyl groups elected in applicant's parent U.S. application have been deleted.

None of these amendments is believed to involve any new matter. Accordingly, it is respectfully requested that the foregoing amendments be entered, that the application as so amended receive an examination on the merits, and that the claims as now presented receive an early allowance.

Respectfully submitted,



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Date: 5-30-01

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APPENDIX A
(Amended Specification)

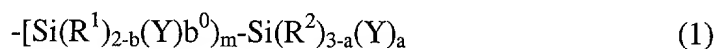
Page 1, immediately following the title please insert:

--Cross Reference to Related Applications

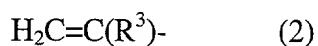
This application is a divisional application of our copending application U.S.S.N. 09/122,876 filed July 28, 1998 and entitled Functional Groups-Terminated Vinyl Polymers, which in turn claimed priority under 35 USC 119 from Japanese applications Hei-9-218089, Hei-9-218090, and Hei-9-218091, all filed on July 28, 1997.--

Page 4, kindly replace the paragraph which encompasses line 28 through page 5, line 4 as follows:

The present invention consists in a vinyl polymer which has at least one terminal functional group per molecule and has a ratio of weight average molecular weight to number average molecular weight of less than 1.8 as determined by gel permeation chromatography, said terminal functional group being a crosslinking silyl group of the general formula (1) shown below, an alkenyl group of the general formula (2) shown below or a hydroxyl group:



wherein R^1 and R^2 each independently represents an alkyl group containing 1 to 20 carbon atom, an aryl group containing 6 to 20 carbon atoms, an aralkyl group containing 7 to 20 carbon atoms or a triorganosiloxy group of the formula $(\text{R}')_3\text{SiO}-$ (R' being a monovalent hydrocarbon residue containing 1 to 20 carbon atoms and the three R' groups being the same or different), provided that when a plurality of R^1 or R^2 groups occur, they may be the same or different; Y represents a hydroxyl group or a hydrolysable group, provided that when a plurality of Y groups occur, they may be the same or different; a represents 0, 1, 2 or 3, b represents 0, 1 or 2, and m represents an integer of 0 to 19, provided that the condition $a + mb \geq 1$ should be satisfied;



wherein R^3 represents a hydrogen atom or a methyl group.

Page 7, kindly amend the paragraph that encompasses line 47 through page 8, line 5 as follows:

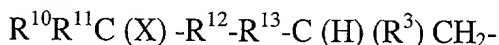
Specific examples of R^5 other than a direct bond include, but are not limited to,
 $-(CH_2)_n-$ (n being an integer of 1 to 20),
 $-CH(CH_3)CH_2-$, $-CH(CH_3)(CH_2)_2-$, $-CH_2CH(CH_3)-$, $-C(CH_3)_2-$, $-(CH_2)_n-O-(CH_2)_m-$ (n and m each independently being an integer of 1 to 20 on condition that $n + m \leq 20$), o-, m-, p- C_6H_4 , o-, m-, p- $(CH_2)_n-C_6H_4-(CH_2)_m-$ (n and m each independently being an integer of 0 to 14 on condition that $n + m \leq 14$), and the like.

Page 8, kindly replace the paragraph that encompasses line 31 through line 40 as follows:

Specific examples of R^6 other than a direct bond include, but are not limited to,
 $-(CH_2)_n-$ (n being an integer of 1 to 20),
 $-CH(CH_3)CH_2-$, $-CH(CH_3)(CH_2)_2-$, $-CH_2CH(CH_3)-$, $-C(CH_3)_2-$, $-(CH_2)_n-O-(CH_2)_m-$ (n and m each independently being an integer of 1 to 20 on condition that $n + m \geq 20$), $-CH(C_6H_5)-$, $-C(CH_3)(C_6H_5)-$, o-, m-, p- C_6H_4 , o-, m-, p- $(CH_2)_n-C_6H_4-(CH_2)_m-$ (n and m each independently being an integer of 0 to 14 on condition that $n + m \leq 14$), and the like.

Page 17, kindly replace the paragraph encompassing lines 25-42 for the following:

The crosslinking silyl-containing organohalogen compound is not limited to any particular species but includes, among others, compounds having the structure of the general formula (15):



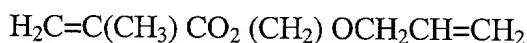
$[Si(R^{15})_{2-b}(Y)_bO]_m-Si(R^{16})_{3-a}(Y)_a$ (15) wherein R^3 , R^{10} , R^{11} , R^{12} , R^{13} and X are as defined above, R^{15} and R^{16} each represents an alkyl, aryl or aralkyl group containing up to 20 carbon atoms or a triorganosiloxy group of the formula $(R')_3SiO-$ (in which R' is a monovalent hydrocarbon group containing 1 to 20 carbon atoms and the three R' groups may be the same or different) and when two or more R^9 or R^{10} groups occur, they may be the same or different; Y represents a hydroxyl group or a hydrolyzable group and when two or more Y groups occur, they may be the same or different; a represents 0, 1, 2 or 3, b represents 0, 1 or 2, and m represents an integer of 0 to 19, provided that the condition $a + mb \geq 1$ should be satisfied.

Page 28, kindly replace the paragraph encompassing lines 8-29 as follows:

A three-necked flask equipped with stirrer, thermometer, reflux condenser and Dean-Stark trap is charged with methacrylic acid (137.7 g, 1.6 mol), ethylene glycol monoallyl ether (80.7 g, 0.8 mol), p-toluenesulfonic acid (0.76 g, 4.0 mmol) and toluene (650 mL). After allowing the reaction to proceed at 120°C for 5 hours, 0.12 g of p-toluenesulfonic acid is added, and the reaction is further allowed to proceed at the same temperature for 6 hours. Then, 0.1 g of p-toluenesulfonic acid is added, and the reaction is further allowed to proceed at the same temperature for 9 hours, whereupon the reaction is completed. During the whole reaction period, methacrylic acid and ethylene glycol monoallyl ether are monitored with liquid chromatography. The final conversion amounted to 98%. The reaction mixture is neutralized by adding an aqueous solution of NaHCO₃ and allowed to separate into two layers. The aqueous layer is extracted once with toluene. The combined organic layer is dried over CaCl₂ and the volatile matter is distilled off under reduced pressure. The crude product is distilled under reduced pressure (60, 2 mmHg) to give 98.7 g (73% yield) of 2-allyloxyethyl methacrylate shown below.

Page 28, kindly replace the paragraph encompassing lines 34-40 as follows:

To 1/2 N-potassium hydroxide/ethanol (200 mL) is added undecylenic acid (18.8 g, 0.102 mol) slowly dropwise at 0°C with constant stirring. The volatile matter is then distilled off to give a crude product. This crude product is washed with acetone and heated in vacuo to provide potassium undecylenate of the following formula as white solid (8.88 g, yield 88%).



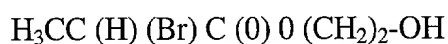
Page 28, kindly replace the paragraph that encompasses lines 45-49 as follows:

Into methanol (245 mL) is added 4-pentenoic acid (49 g, 0.489 mol) and potassium tert-butoxide (54.9 g, 0.489 mol), and the mixture is stirred at 0°C. The volatile matter is then distilled off under reduced pressure to provide potassium 4-petenoate of the following formula.



Page 29, kindly replace the paragraph that encompasses lines 4-18 as follows:

In a nitrogen atmosphere, 2-bromopropionyl chloride (2 mL, 3.35 g, 19.5 mmol) is added dropwise slowly at 0°C to a THF (tetrahydrofuran) solution (10 mL) of ethylene glycol (10.9 mL, 195 mmol) and pyridine (3 g, 39 mmol). The solution is stirred at that temperature for 2 hours. Dilute hydrochloric acid (20 mL) and ethyl acetate (30 mL) are added and the mixture is allowed to separate into two layers. The organic layer is washed with dilute hydrochloric acid and brine and dried over Na₂SO₄, and the volatile matter is then distilled off under reduced pressure to give a crude product (3.07 g). This crude product is distilled under reduced pressure (70~73, 0.5 mmHg) to give hydroxyethyl 2-bromopropionate of the formula shown below (2.14 g, 56%):



Page 29, kindly replace the paragraph encompassing lines 22-36 as follows:

A 50-mL two-necked flask is purged with nitrogen and then charged with 2-allyloxyethanol (2.5 mL, 23.4 mmol), pyridine (3 mL) and THF (10 mL). The solution is cooled to 0°C, and 2-bromopropionyl chloride (2 mL, 19.52 mmol) is added dropwise slowly. The resulting mixture is stirred at that temperature for an hour, then ethyl acetate (10 mL) is added, and the resulting pyridine hydrochloride is filtered off. The filtrate is washed with dilute hydrochloric acid (10 mL), then with an aqueous solution of NaHCO₃ (10 mL) and further with brine (10 mL). The organic layer is dried over Na₂SO₄ and the volatile matter is distilled off under reduced pressure. The crude product thus obtained is distilled under reduced pressure to give allyloxyethyl 2-bromopropionate (78.5-81 (1.3 mmHg), 2.986 g) of the formula shown below.



Page 29, kindly replace the paragraph encompassing line 40 through page 30, line 9 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2' bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20mL). After dissolved oxygen elimination by bubbling with nitrogen, the reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to

proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110° for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 30, kindly replace the paragraph encompassing lines 10-24 as follows:

Then, undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) is added dropwise slowly to a toluene solution (100 mL) of the hydroxyl-terminated poly(n-butyl acrylate) obtained in the above manner (50 g) and pyridine (10 mL) in a nitrogen atmosphere at 75°C, and the mixture is stirred at 75°C for 3 hours. The resulting white precipitate is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give alkenyl-containing poly(n-butyl acrylate) (43 g). The polymer has a number average molecular weight of 5,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.30. The number of alkenyl groups introduced per oligomer molecule is found to be 2.28 upon ¹H NMR analysis.

Page 30, kindly replace the paragraph encompassing lines 25-40 as follows:

Then, a 30-mL pressure reaction vessel is charged with the thus-obtained poly(butyl acrylate) having alkenyl groups at both ends (2 g), methyldimethoxysilane (0.32 mL), methyl orthoformate (0.09 mL, 3 equivalents relative to the alkenyl group) and platinum(0)-1,1,3,3,-tetramethyl-1,3-divinyldisiloxane complex (8.3 x 10⁻⁸ mol/L xylene solution, 10⁻⁴ equivalent relative to the alkenyl group), and the mixture is stirred at 100°C for an hour. The volatile matter is distilled off to give 2 g of poly(n-butyl acrylate) having methyldimethoxysilyl groups at both ends, as represented by the formula shown below. The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.37. The number of silyl groups introduced per oligomer molecule is 2.24 as determined by ¹H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 2-24 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 1 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20mL). After dissolved oxygen elimination by purging with nitrogen, the reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110 for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed with 10% hydrochloric acid and brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of hydroxyl-terminated poly(n-butyl acrylate). The polymer has viscosity of 25 Pa.s. The polymer has a number average molecular weight of 5,100 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29. The average number of hydroxyl groups introduced per polymer molecule is found to be 2.28 upon 1H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 26-40 as follows:

Undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) is added dropwise slowly to a toluene solution (100 mL) of the hydroxyl-terminated poly(n-butyl acrylate) obtained above (50 g) and pyridine (10 mL) in a nitrogen atmosphere at 75°C, and the mixture is stirred at 75°C for 3 hours. The resulting white precipitate is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give alkenyl-containing poly(n-butyl acrylate) (43 g). The polymer has a number average molecular weight of 5,400 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.30. The number of alkenyl groups introduced per polymer molecule is found to be 2.28 upon 1H NMR analysis.

Page 31, kindly replace the paragraph encompassing lines 43-52, line 7 as follows:

A 30-mL pressure reaction vessel is charged with the thus-obtained poly(butyl acrylate) having alkenyl groups at both ends (2 g), methyldimethoxysilane (0.32 mL), methyl orthoformate (0.09 mL, 3 equivalents relative to the alkenyl group) and platinum bis(divinyltetramethyldisiloxane) (8.3×10^{-8} mol/L xylene solution, 10⁴ equivalent relative to the alkenyl group), and the mixture is stirred at 100°C for an hour. The volatile matter is distilled off 31 to give 2 g of a crosslinking silyl-having poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,900 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.37. The number of silyl groups introduced per polymer molecule is 2.24 as determined by ¹H NMR analysis.

Page 32, kindly replace the paragraph encompassing lines 20-31 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 2, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 88% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.32 Mpa and the breaking elongation is 34%.

Page 32, kindly replace the paragraph encompassing lines 35-50 as follows:

A 500-mL pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), dibromoxylene (4.12 g, 15.6 mmol), cuprous bromide (2.45 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20 mL). After dissolved oxygen elimination by bubbling nitrogen gas, the vessel is sealed, and the mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, followed by reaction at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), and passed through an activated alumina column for removing the copper catalyst to give a bromine-terminated polymer. The polymer has a number average molecular weight of 5,700 (mobile phase: chloroform, polystyrene equivalent), with a molecular weight distribution of 1.37.

Page 33, kindly replace the paragraph encompassing lines 21-32 as follows:

A 200-mL pressure reaction vessel is charged with 60 g of the thus-obtained, alkenyl-terminated polymer, 8.4 mL (68.1 mmol) of methyldimethoxysilane, 2.5 mL (22.9 mmol) of methyl orthoformate, and platinum bis(divinyl-tetramethyldisiloxane) (5×10^{-3} mmol). The reaction is allowed to proceed at 100°C for 4 hours to give a crosslinking silyl-having polymer. The polymer has a number average molecular weight of 6,000 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.44. The number of crosslinking silyl groups per polymer molecule is 1.59 as determined by ^1H NMR analysis.

Page 33, kindly replace the paragraph encompassing line 50 through page 34, line 10 as follows:

A 500-mL flask is charged with cuprous bromide (0.63 g, 4.4 mmol), pentamethyldiethylenetriamine (0.76 g, 4.4 mmol), acetonitrile (5 mL), diethyl 2,5-dibromoadipate (1.6 g, 4.4 mmol), and butyl acrylate (44.7 g, 349 mmol). After carrying out freeze degassing, the reaction is allowed to proceed at 70°C for 7 hours in a nitrogen atmosphere. The mixture is passed through an activated alumina column for removing copper catalyst to obtain a bromine-terminated polymer. The polymer obtained has a number average molecular weight of 10,700, and a molecular weight distribution of 1.15.

Page 34, kindly replace the paragraph encompassing lines 12-24 as follows:

In a nitrogen atmosphere, a 200-mL flask is charged with 35 g of the halogen-terminated poly(n-butyl acrylate) obtained above, 2.2 g (16.1 mmol) of potassium pentenoate, and 35 mL of DMAc. The reaction is allowed to proceed at 70°C for 4 hours. Potassium pentenoate unreacted and potassium bromide formed in the reaction mixture is removed by water extraction to obtain an alkenyl-terminated polymer. The polymer obtained has a number average molecular weight of 11,300 as determined with GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.12. The number of alkenyl groups per polymer molecule is 1.82 as determined by ^1H NMR analysis.

Page 33, kindly replace the paragraph encompassing lines 35-46 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 3, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 2 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 93% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.26 Mpa and the breaking elongation is 75%.

Page 34, kindly replace the paragraph that encompasses line 42 through page 35, line 3 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 4, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 98% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.35 Mpa and the breaking elongation is 77%.

Page 35, kindly replace the paragraph that encompasses lines 7-28 as follows:

A 100-mL glass reaction vessel is charged with butyl acrylate (50.0 mL, 44.7 g, 0.349 mol), cuprous bromide (1.25 g, 8.72 mmol), pentamethyldiethylenetriamine (1.82 mL, 1.51 g, 8.72 mmol), and acetonitrile (5 mL). After cooling and degassed under reduced pressures, the inside of the reaction vessel is purged with nitrogen gas. After stirring thoroughly, diethyl 2,5-dibromoadipate (1.57 g, 4.36 mmol) is added and the mixture is stirred and heated at 70°C. After 60 minutes, 1,7-octadiene (6.44 mL, 4.80 g, 43.6 mmol) is added to this mixture and heating is continued at 70°C for 2 hours with stirring. The reaction mixture is treated with activated alumina and the volatile matter is distilled off by heating under reduced pressures. The residue is dissolved into ethyl acetate, and washed with 2% hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and the volatile matter is distilled off by heating under reduced pressures to give an alkenyl-terminated polymer. The polymer has a number average molecular weight of 13,100 as determined by GPC (polystyrene equivalent), with a molecular

weight distribution of 1.22. The number of alkenyl groups per polymer molecule is 2.01 as determined by ¹H NMR analysis.

Page 35, kindly replace the paragraph encompassing lines 31-37 as follows:

The alkenyl-terminated poly(n-butyl acrylate) obtained above (3.05 g) and the same weight of aluminum silicate (Kyowa Chemical's Kyowaad 700PEL) are mixed with toluene, and stirred at 100°C. After 4 hours, aluminum silicate is filtered off and the volatile matter of the filtrate is distilled off by heating under reduced pressures to purify the polymer.

Page 36, kindly replace the paragraph encompassing line 5-16 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 5, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 85% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.34 Mpa and the breaking elongation is 86%.

Page 36, kindly replace the paragraph encompassing lines 20-31 as follows:

A 500-mL flask is charged with cuprous bromide (0.63 g, 4.4 mmol), pentamethyldiethylenetriamine (0.76 g, 4.4 mmol), acetonitrile (5 mL), diethyl 2,5-dibromoadipate (0.78 g, 2.2 mmol), and butyl acrylate (44.7 g, 349 mmol). After carrying out freeze degassing, the reaction is allowed to proceed at 70°C for 6 hours in a nitrogen atmosphere. The mixture is passed through an activated alumina column for removing copper catalyst to obtain a bromine-terminated polymer. The polymer obtained has a number average molecular weight of 23,600 as determined by GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.14.

Page 36, kindly replace the paragraph encompassing lines 33-50 as follows:

In a nitrogen atmosphere, a 200-mL flask is charged with 34 g of the bromine-terminated polymer obtained above, 1.0 g (7.6 mmol) of potassium pentenoate; and 34 mL of DMAc. The

reaction is allowed to proceed at 70°C for 4 hours. Potassium pentenoate unreacted and potassium bromide formed in the reaction mixture is removed by water extraction to obtain an alkenyl-terminated polymer. This alkenyl-terminated polymer and the same weight (30.5 g) of aluminum silicate (Kyowa Chemical's Kyowaad 700PEL) is mixed with toluene, and stirred at 100°C. After 4 hours, aluminum silicate is filtered off and the volatile matter of the filtrate is distilled off by heating under reduced pressures to purify the polymer. The polymer obtained has a number average molecular weight of 24,800 as determined with GPC (mobile phase: chloroform, polystyrene basis), and a molecular weight distribution of 1.14. The number of alkenyl groups per polymer molecule is 1.46 as determined by ¹H NMR analysis.

Page 37, kindly replace the paragraph that encompasses lines 2-14 as follows:

A 200-mL pressure reaction vessel is charged with 21 g of the thus-obtained, alkenyl-terminated polymer, 0.94 mL (7.6 mmol) of methyltrimethoxysilane, 0.13 mL (1.3 mmol) of methyl orthoformate, and platinum bis(divinyl-tetramethyldisiloxane) (2×10^{-4} mmol). The reaction is allowed to proceed at 100°C for 4 hours to give a crosslinking silyl-terminated polymer. The viscosity of the polymer obtained is 100 Pa.s. The polymer has a number average molecular weight of 25,400 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.16. The number of crosslinking silyl groups per polymer molecule is 1.48 as determined by ¹H NMR analysis.

Page 37, kindly replace the paragraph encompassing lines 17-28 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 6, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 2 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 94% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.40 Mpa and the breaking elongation is 323%.

Page 37, kindly replace the paragraph encompassing line 46 through page 38, line 6 as follows:

One hundred parts by weight of the crosslinking silyl-containing polymer as obtained in Comparative Example 1, one part by weight of water, and one part by weight of dibutyltin dimethoxide are mixed up, cast into a mold having a thickness of 2 mm, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 10 days, a uniform rubber-like cured sheet is obtained. The gel fraction is 78% as obtained by toluene extraction. Dumbbell (No. 2(1/3)) is punched out from the rubber-like cured sheet and subjected to tensile testing (200 mm/min) with autograph. The breaking strength is 0.14 Mpa and the breaking elongation is 69%.

Page 38, kindly replace the paragraph encompassing lines 11-20 as follows:

In one-liter flask, 210 g of toluene, 293 g of butyl acrylate, 7.2 g of methyltrimethoxysilylpropyl methacrylate, and 1.8 g of azobisisobutyronitrile are polymerized at 105°C for 7 hours with nitrogen bubbling. Toluene is distilled off to give a crosslinking silyl-containing poly(n-butyl acrylate). The viscosity of the polymer obtained is 110 Pa.s. The polymer has a number average molecular weight of 9,600 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 2.86.

Page 40, kindly replace the paragraph encompassing lines 39-43 as follows:

A portion of the cured sheet of crosslinking silyl-containing poly(n-butyl acrylate) as obtained in Reference Example 4 was placed in an oven maintained at 150°C and taken out after 24 hours for observation of the surface state. The surface showed no abnormalities.

Page 40, kindly replace the paragraph encompassing line 48 through page 41, line 14 as follows:

A 200-ml flask was charged with 97 g of vinyl-terminated polydimethylsiloxane (DMS-V25, product of Adimax; unsaturated group equivalent 0.11 eq/kg), 2.3 g (21.4 mmol) of methyltrimethoxysilane and 10⁻³ mmol of platinum bis (divinyltetramethyldisiloxane), and the reaction was allowed to proceed at 70°C for 6 hours. The thus-obtained crosslinking silyl-terminated polydimethylsiloxane had a number average molecular weight of 11,900 as

determined by GPC (mobile phase chloroform, polystyrene equivalent) with a molecular weight distribution of 2.52. In ^1H -NMR analysis (300 MHz), the unsaturated group-due peak was found disappeared and the number of crosslinking silyl groups per polydimethylsiloxane polymer molecule was 2 as determined based on the intensity ratio between the methyl protons bound to the silicon atoms originating from the main chain of the polymer and the protons of the methoxysilyl groups. The viscosity was 6 poises.

Page 41, kindly replace the paragraph encompassing lines 18- 27 as follows:

The crosslinking silyl-containing polymer of Comparative Example 3 (100 weight parts) was admixed with 1 weight part of water and 1 weight part of dibutyltin dimethoxide and, after thorough stirring, the mixture was poured into a mold with a thickness of 2 mm. After deforming under reduced pressure, thermal curing was effected at 50°C for 10 days. A portion of the cured sheet obtained was placed in an oven at 150°C and taken out after 24 hours for observation of the surface state. The surface showed no abnormalities.

Page 41, kindly replace the paragraph encompassing line 48 to page 42, line 4 as follows:

A 200-g portion of the allyl-terminated polymer obtained in the above manner was heated to about 75°C , then 1.5 eq/vinyl group of methyldimethoxysilane and 5×10 eq/vinyl group of platinum-vinylsiloxane complex were added and the hydrosilylation reaction was carried out. The reaction was monitored by FT-IR analysis. In about 20 hours, the olefin absorption at 1640 cm^{-1} disappeared.

Page 42, kindly replace the paragraph encompassing lines 14-23 as follows:

The crosslinking silyl-terminated polymer of Comparative Example 4 (100 weight parts) was admixed with weight part of water and 1 weight part of dibutyltin dimethoxide and, after thorough stirring, the mixture was poured into a mold with a thickness of 2 mm. After deforming under reduced pressure, thermal curing was effected at 50°C for 10 days. A portion of the cured sheet obtained was placed in an oven at 150°C and taken out after 24 hours for observation of the surface state. The surface was found melted, partly with exudation of a liquid.

Page 43, kindly replace the paragraph encompassing lines 27- 38 as follows:

The crosslinking silyl-containing polymer (100 weight parts) obtained in Example 5 was dehydrated azeotropically with toluene. Then, in a nitrogen atmosphere, 1 weight part of methyltrimethoxysilane and 1 weight part of dibutyltin diacetylacetonate were added in sequence, and the mixture was stored in a tightly stoppered sample bottle. The thus-prepared one-pack composition was stored in a constant-temperature, constant-humidity room (23°C, 60% RH) for a week and then discharged into a sample tube. At 24 hours after discharge, the cured portion was taken out and the thickness thereof in the direction of depth was measured and found to be 3 mm.

Page 45, kindly replace the paragraph encompassing line 47 through page 46 line 17 as follows:

A 30-mL glass pressure reaction vessel is charged with butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α , α' -dibromo-p-xylene (185 mg, 0.70 mmol), cuprous bromide (100 mg, 0.70 mmol), 2,2'-bipyridyl (217 mg, 1.40 mmol), ethyl acetate (4 mL) and acetonitrile (one mL). After dissolved oxygen elimination by bubbling nitrogen gas for 10 minutes, the vessel is sealed, and the mixture is heated at 130 for 2 hours to allow the reaction to proceed. After cooling the mixture, methyl-dimethoxysilylpropyl methacrylate (650 mg, 2.8 mmol) is added and the reaction is allowed to proceed at 100°C for 2 hours. After cooling, the mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with ammonium chloride and once with brine. The organic layer is dried over Na₂SO₄ and the volatile matter is distilled off under reduced pressure to give 4.78 g (90%) of methyl-dimethoxysilyl-terminated poly(butyl acrylate). The polymer has a number average molecular weight of 7,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.74. The number of silyl groups introduced per polymer molecule is 3.2 as determined by ¹H NMR analysis.

Page 46, kindly replace the paragraph encompassing lines 20- 40 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (89.6 mL) and acetonitrile (22.4 mL) and, after dissolved oxygen elimination by blowing with nitrogen gas

for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for one hour to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110 for one hour. The reaction mixture is diluted with ethyl acetate, the insoluble matter is filtered off, and the filtrate is washed three times with 10% -hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressures to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.35.

Page 46, kindly replace the paragraph encompassing line 41 through page 47, line 5 as follows:

Then, to a toluene solution (100 mL) of the thus obtained, hydroxyl-terminated poly(n-butyl acrylate) (68 g) and pyridine (14 mL) is added dropwise slowly undecenoyl chloride (7.1 mL, 33.0 mmol) in a nitrogen atmosphere at 75 . The reaction is allowed to proceed at 60°C. The resulting white solid is filtered off. The organic layer is washed with dilute hydrochloric acid and brine, and dried over Na₂SO₄ and concentrated under reduced pressures to give an alkenyl-terminated poly(n-butyl acrylate) (64 g). To a toluene solution of the polymer is added aluminum silicate (Kyowa Chemical's Kyowaad 700PEL). The solution is stirred at the refluxing temperature to thereby remove the trace impurities in the polymer. The number of alkenyl groups introduced per oligomer molecule is 2.8 as determined by ¹H NMR analysis.

Page 47, kindly replace the paragraph encompassing lines 33- 39 as follows:

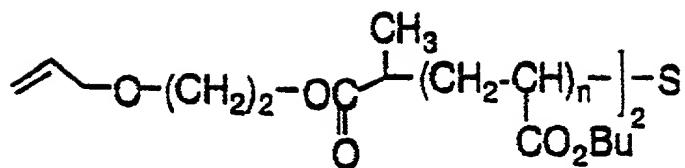
The thus-obtained composition is cast into a mold, and defoamed under reduced pressures. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. This cured product is immersed in toluene for 24 hours and the gel fraction is determined from the weight change after and before immersion. The gel fraction is 88%.

Page 49, kindly replace the paragraph encompassing line 5 through page 50 line 16 as follows:

A 30-ml glass pressure reaction vessel is charged with butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α , α' -dibromo-p-xylene (180 mg, 0.69 mmol), cuprous bromide (98 mg, 0.69 mmol), 2,2'-bipyridyl (319 mg, 2.06 mmol), ethyl acetate (4 mL) and acetonitrile (1 mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the vessel is sealed. The reaction mixture is heated at 130°C for an hour to allow the reaction to proceed. After cooling the mixture, allyltributyltin (0.51 mL, 1.64 mmol) is added in a nitrogen atmosphere and the reaction is allowed to proceed at 100°C for an hour. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give a mixture of poly(butyl acrylate) having alkenyl groups at both ends, as represented by the formula shown below, and bromotributyltin (4.48 g yield). The polymer has a number average molecular weight of 6,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.57. The number of alkenyl groups introduced per oligomer molecule is 2.2 as determined by ¹H NMR analysis.

Page 50, kindly replace the paragraph encompassing lines 21-41 as follows:

A 30-mL glass pressure reaction vessel is charged with butyl acrylate (2.5 mL, 2.24 g, 17.45 mmol), the alkenyl-containing initiator obtained in Production Example 5 (165 mg, 0.698 mmol), cuprous bromide (100 mg, 0.698 mmol), 2,2'-bipyridyl (218 mg, 1.40 mmol), acetonitrile (0.5 mL) and ethyl acetate (2 mL) and, after dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for 50 minutes to allow the reaction to proceed. After cooling to room temperature, the reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressure to give 1.90 g (79%) of poly(butyl acrylate) having an alkenyl group at one end and bromine at the other end. The polymer has a number average molecular weight of 3,600 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.51. The number of alkenyl groups introduced per oligomer molecule is 0.75 as determined by ¹H NMR analysis.



Page 50, kindly delete the extraneous material at the bottom of the page below the page number.

Page 51, kindly replace the paragraph encompassing lines 17-37 as follows:

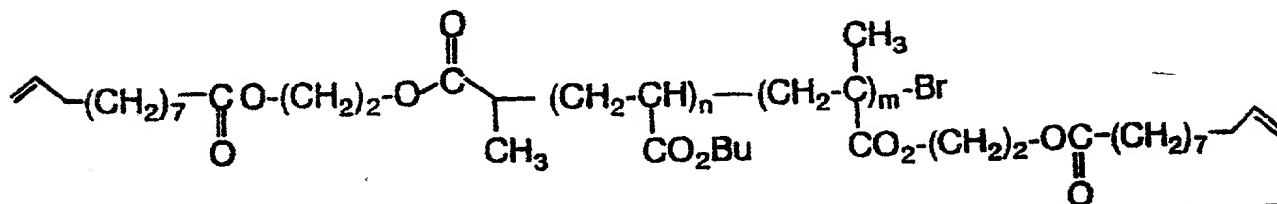
A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2' bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 51, kindly replace the paragraph encompassing line 38 through page 52, line 3 as follows:

Then, to a toluene solution (100 mL) of the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (50 g) and pyridine (10 mL) is added dropwise slowly undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) in a nitrogen atmosphere at 75. The resulting mixture is stirred at 75°C for 3 hours. The resulting white solid is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) (43 g) of the formula given below. The polymer has a number average molecular weight of 5,400

(polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.30.

The number of alkenyl groups introduced per oligomer



molecule is 2.28 as determined by ^1H NMR analysis.

Page 52, kindly replace the paragraph encompassing line 6 through page 53, line 17 as follows:

Poly(n-butyl acrylate) having hydroxyl groups at both ends is synthesized according to Production Example 3 of Japanese Kokai Publication Hei-06-211922. Thus, a 100-mL three-necked flask equipped with magnetic stirrer and dropping funnel is charged with 2-hydroxyethyl disulfide (30.8 g, 24.4 mL, 0.2 mol). The flask is heated to 100, and the mixture of n-butyl acrylate (12.8 g, 14.32 mL, 0.1 mol) and AIBN (azobisisobutyronitrile) (0.328 g, 0.002 mol) is added dropwise over 30 minutes. The resulting mixture is further stirred at 100°C for an hour. Toluene (20 mL) is then added, the mixture is allowed to stand in a separating funnel, and the lower layer is separated. The upper layer is washed three times with water and dried over Na_2SO_4 , and the volatile matter is distilled off under reduced pressure to give poly(n-butyl acrylate) having hydroxyl groups at both ends (12.18 g, 95%). The polymer has a number average molecular weight of 4,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.22.

Page 53, kindly replace the paragraph encompassing lines 18-31 as follows:

Then, to a toluene solution (15 mL) containing the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (10.51 g) and pyridine (2 mL) is added dropwise slowly undecenoyl chloride (0.898 mL, 848 mg, 4.18 mmol) in a nitrogen atmosphere at 60°C , and the resulting mixture is stirred at 60°C for 3 hours. The resulting white solid is filtered off, and the organic

layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na_2SO_4 and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) of the formula shown below (7.45 g). The polymer has a number average molecular weight of 4,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.31.

Page 55, kindly replace the paragraph encompassing lines 10-27 as follows:

In a 500-mL three-necked flask equipped with a reflux condenser, n-butyl acrylate (300 mL) is polymerized at 70°C in a nitrogen atmosphere using a catalyst cuprous bromide (1.50 g, 10.5 mmol), a ligand pentamethyldiethylenetriamine (1.65 mL), an initiator diethyl 2,5-dibromoadipate (9.42 g, 26.2 mmol), and a solvent acetonitrile (30 mL). When the polymerization rate of n-butyl acrylate is 93%, 1,7-octadiene (38.6 mL, 0.261 mol) is added. The mixture is heated at the same temperature, and then is diluted with ethyl acetate. The solution is passed through an activated alumina column for removing the catalyst. Its volatile matter is distilled off to give an alkenyl-terminated polymer. The polymer has a number average molecular weight of 13,800 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.28. The number of alkenyl groups introduced per oligomer molecule is 1.84 upon ^1H NMR analysis.

Page 55, kindly replace the paragraph encompassing lines 30-47 as follows:

A 30-mL glass pressure reaction vessel is charged with n-butyl acrylate (7.5 mL, 6.72 g, 51.3 mmol), α, α' -dibromo-p-xylene (270 mg, 1.03 mmol), cuprous bromide (150 mg, 1.03 mmol), 2,2'-bipyridyl (323 mg, 2.06 mmol), ethyl acetate (6 mL) and acetonitrile (1.5 mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the reaction vessel is sealed. The mixture is heated at 130°C for 1.5 hours to allow the reaction to proceed. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na_2SO_4 , and the volatile matter is distilled off under reduced pressures to give 5.0 g (75% polymerization yield) of a halogen-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 5,600 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.32.

Page 55, kindly replace the paragraph encompassing line 48 through page 56 line 8 as follows:

In a nitrogen atmosphere, the above polymer (5.00 g), potassium undecylenate synthesized in Production Example 2 (476 mg, 2.14 mmol), and dimethylacetamide (10 mL) are allowed to react at 70°C for 6 hours. The volatile matter of the mixture is distilled off under reduced pressures, and after adding ethyl acetate, the insoluble matter is filtered off. The volatile matter of the filtrate is distilled off under reduced pressures to give 4.77 g of an alkenyl-terminated poly(n-butyl acrylate). The number of alkenyl groups introduced per oligomer molecule is 1.70 upon ¹H NMR analysis.

Page 56, kindly replace the paragraph encompassing lines 11-20 as follows:

In the same manner as in Example 15, n-butyl acrylate (300 mL) is polymerized at 70°C in a nitrogen atmosphere using a catalyst cuprous bromide (1.50 g, 10.5 mmol), a ligand pentamethyldiethylenetriamine (0.69 mL), an initiator diethyl 2,5-dibromoadipate (9.42 g, 26.2 mmol), and a solvent acetonitrile (30mL), to thereby give a halogen-terminated poly(n-butyl acrylate). The polymer has a number average molecular weight of 11,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.16.

Page 56, kindly replace the paragraph encompassing lines 28- 50 as follows:

A 30-mL glass pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α, α'-dibromo-p-xylene (180 mg, 0.69 mmol), cuprous bromide (98 mg, 0.69 mmol), 2,2'-bipyridyl (319 mg, 2.06 mmol), ethyl acetate (4 mL) and acetonitrile (one mL). After dissolved oxygen elimination by blowing nitrogen gas for 10 minutes, the reaction vessel is sealed. The mixture is heated at 130°C for one hour to allow the reaction to proceed. After cooling the mixture, allyltributyltin (0.51 mL, 1.64 mmol) is added in a nitrogen atmosphere and the reaction is allowed to proceed at 100°C for one hour. The reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the volatile matter is distilled off under reduced pressures to give a mixture of an alkenyl-terminated poly(n-butyl acrylate) and bromotributyltin (4.48 g yield). The polymer has a number average molecular weight of 6,300 (polystyrene equivalent) as determined by GPC, with

a molecular weight distribution of 1.57. The number of alkenyl groups introduced per oligomer molecule is found to be 2.2 upon ^1H NMR analysis.

Page 57, kindly replace the paragraph encompassing lines 2-24 as follows:

A 30-mL glass pressure reaction vessel is charged with methyl acrylate (5 mL, 4.78 g, 55.5 mmol), allyl 2-methyl-2-bromopropionate (0.354 mL, 460 mg, 2.22 mmol), cuprous bromide (318 mg, 2.22 mmol), 2,2'-bipyridyl (1.04 g, 6.66 mmol), acetonitrile (one mL), and ethyl acetate (4 mL). After dissolved oxygen elimination by carrying out vacuum degassing three times, the reaction vessel is sealed. The mixture is heated at 80°C for 3 hours to allow the reaction to proceed. After cooling the mixture to the room temperature, the reaction mixture is diluted with ethyl acetate (20 mL), the resulting insoluble matter is filtered off, and the filtrate is washed twice with dilute hydrochloric acid and once with brine. The organic layer is dried over Na_2SO_4 , and the volatile matter is distilled off under reduced pressures to give 3.93 g (75%) of a poly(methyl acrylate) having an alkenyl group at one end and bromine at the other end. The polymer has a number average molecular weight of 2,700 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.48. The number of alkenyl groups introduced per oligomer molecule is 0.81 upon ^1H NMR analysis.

Page 57, kindly replace the paragraph beginning at line 41 through page 58 at line 11 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (22 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g; 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with brine. The organic layer is dried over Na_2SO_4 , and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The polymer has a number average molecular

weight of 5,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29.

Page 58, kindly replace the paragraph encompassing lines 12-21 as follows:

Then, to a toluene solution (100 mL) of the thus-obtained hydroxyl-terminated poly(n-butyl acrylate) (50 g) and pyridine (10 mL) is added dropwise slowly undecenoyl chloride (7.22 mL, 6.81 g, 33.6 mmol) in a nitrogen atmosphere at 75. The resulting mixture is stirred at 75°C for 3 hours. The resulting white solid is filtered off, and the organic layer is washed with dilute hydrochloric acid and brine. The organic layer is dried over Na₂SO₄ and concentrated under reduced pressure to give an alkenyl-terminated poly(n-butyl acrylate) (43 g).

Page 58, kindly replace the paragraph encompassing lines 43 through page 59 line 2 as follows:

A portion of each composition thus obtained is subjected to curing testing on a hot plate at 130°C and the gel time is measured. The remaining portion of the composition is degassed under reduced pressure and then poured into a mold and cured by heating at 100°C to give a rubber-like cured product. The cured product is immersed in toluene for 24 hours. The weights before and after immersion are measured and the gel fraction is determined based on the change in weight. The results thus obtained are shown in Table 4.

Page 60, kindly replace the paragraph encompassing line 11 through page 61 line 20 as follows:

A 30-mL pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), the hydroxyl-containing initiator obtained in Production Example 4 (138 mg, 0.698 mmol), cuprous bromide (100 mg, 0.698 mmol), 2,2'-bipyridyl (218 mg, 1.40 mmol), ethyl acetate (4 mL) and acetonitrile (one mL), and after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130° for 2 hours to allow the reaction to proceed. The reaction vessel is then cooled to room temperature, 2-hydroxyethyl methacrylate (0.176 mL, 182 mg, 1.40 mmol) is added, and the reaction is allowed to proceed at 100°C for 2 hours.. The reaction mixture is diluted with ethyl acetate (20 mL), the insoluble matter is filtered off, and the filtrate is washed twice with 10% hydrochloric acid and once with

brine. The organic layer is dried over Na_2SO_4 , and the solvent is distilled off under reduced pressure to give 4.44 g (93% yield) of a hydroxyl-terminated poly(n-butyl acrylate) having the formula shown below. The polymer has a number average molecular weight of 6,100 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.32. The number of hydroxyl groups per polymer molecule is on average 3.3 as determined by NMR measurement. The viscosity of this polymer as determined by using an E type viscometer (shear rate: 10 sec^{-1} , 23) is 388 poises.

Page 61, kindly replace the paragraph encompassing line 25 through page 62, line 3 as follows:

Poly(n-butyl acrylate) having hydroxyl groups at both ends is synthesized according to Example 1 of Japanese Kokai Publication Hei-05-262808. Thus, a 100-mL three-necked flask equipped with magnetic stirrer and dropping funnel is charged with 2-hydroxyethyl disulfide (30.8 g, 24.4 mL, 0.2 mol). The flask is heated to 100°C , and a mixture of n-butyl acrylate (12.8 g, 14.32 mL, 0.1 mol) and AIBN (0.328 g, 0.002 mol) is added dropwise over 30 minutes. The mixture is further stirred at 100°C for an hour. Toluene (20 mL) is then added, the mixture is allowed to stand in a separating funnel, and the lower layer is separated. The upper layer is washed three times with water and dried over Na_2SO_4 , and the volatile matter is distilled off under reduced pressure to give a poly(n-butyl acrylate) having hydroxyl groups at both ends (12.18 g, 95%). The polymer has a number average molecular weight of 4,300 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 4.22. The viscosity of this polymer as determined by using an E type iscometer (shear rate: 10 sec^{-1} , 23) is 490 poises. The average number of hydroxyl group per polymer molecule is 1.42 as determined by ^1H NMR analysis.

Page 63, kindly replace the paragraph that encompasses line 13 through page 64, line 6 as follows:

A one-liter pressure reaction vessel is charged with n-butyl acrylate (112 mL, 100 g, 0.78 mol), the hydroxyl-containing initiator obtained in Production Example 4 (3.07 g, 15.6 mmol), cuprous bromide (2.24 g, 15.6 mmol), 2,2'-bipyridyl (4.87 g, 31.2 mmol), ethyl acetate (90 mL) and acetonitrile (20mL). After dissolved oxygen elimination by bubbling with nitrogen, the

reaction vessel is sealed. The mixture is heated at 130°C for 2 hours to allow the reaction to proceed. The reaction vessel is cooled to room temperature, 2-hydroxyethyl methacrylate (3.92 mL, 4.06 g, 31.2 mmol) is added, and the reaction is allowed to proceed at 110°C for 2 hours. The reaction mixture is diluted with ethyl acetate (200 mL), the insoluble matter is filtered off, and the filtrate is washed with log hydrochloric acid and with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 82 g of a hydroxyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 25 Pa.s. The polymer has a number average molecular weight of 5,100 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.29. Its ¹H NMR analysis showed that the polymer contained, on an average, 2.39 hydroxyl groups per molecule.

Page 64, kindly replace the paragraph encompassing lines 9-25 as follows:

The hydroxyl-terminated poly(n-butyl acrylate) obtained above (4.94 g, OH = 2.30 mmol) is dehydrated by azeotropy at 50 in the presence of toluene. To this are added tin octynate (4.9 mg) and toluene (6 mL), and then methyldimethoxysilylpropyl isocyanate (0.524 g, 2.77 mmol) is added dropwise at 50°C. After completion of addition, the reaction temperature is raised to 70°C, with continuing reaction for 4 hours. It is concluded that there are no hydroxyl groups unreacted because the signal (3.8 ppm) of methylene group bound to hydroxyl group is disappeared in ¹H NMR. The volatile matter is distilled off under reduced pressures to give a crosslinking silyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 22 Pa.s. The polymer has a number average molecular weight of 4,900 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.60.

Page 64, kindly replace the paragraph encompassing lines 28-34 as follows:

One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Example 21 is mixed with one part by weight of dibutyltin diacetylacetonate, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 93% as obtained by toluene extraction.

Page 64, kindly replace the paragraph encompassing line 43 through page 65 line 9 as follows:

The hydroxyl-terminated poly(n-butyl acrylate) obtained in Comparative Example 6 (4.52 g, OH = 1.85 mmol) is dehydrated by azeotropy at 50°C in the presence of toluene. To this are added tin octynate (4.52 mg) and toluene (6 mL), and then methyldimethoxysilylpropyl isocyanate (0.421 g, 2.22 mmol) is added dropwise at 50°C. After completion of adding, the reaction temperature is raised to 70°C, with continuing reaction for 4 hours. It is included that there are no hydroxyl groups unreacted because the signal (3.8 ppm) of methylene group bound to hydroxyl group is disappeared in ¹H NMR. The volatile matter is distilled off under reduced pressures to give a crosslinking silyl-terminated poly(n-butyl acrylate). The viscosity of this polymer is 53 Pa.s. The polymer has a number average molecular weight of 4,700 (mobile phase: chloroform, polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 3.71.

Page 65, kindly replace the paragraph encompassing lines 12-20 as follows:

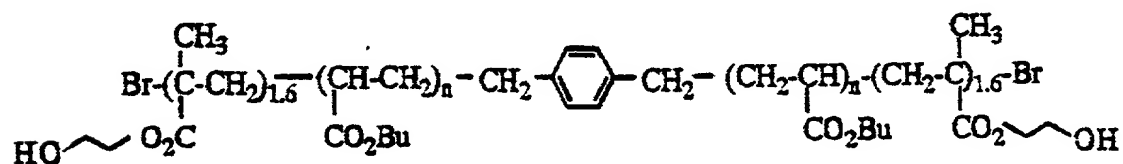
One hundred parts by weight of the crosslinking silyl-terminated polymer as obtained in Comparative Example 7 is mixed with one part by weight of dibutyltin diacetylacetonate, cast into a mold, and defoamed at room temperature using a reduced pressure drier. After cured by heating at 50°C for 20 hours, a uniform rubber-like cured sheet is obtained. The gel fraction is 82% as obtained by toluene extraction. The extract is concentrated to measure ¹H NMR, but there are no crosslinking silyl groups.

Page 65, kindly replace the paragraph encompassing lines 27-49 as follows:

A 30-mL pressure reaction vessel is charged with n-butyl acrylate (5 mL, 4.47 g, 34.9 mmol), α-α'-dibromo-p-xylene (185 mg, 0.70 mmol), cuprous bromide (100 mg, 0.70 mmol), 2,2'-bipyridyl (326 mg, 2.10 mmol), ethyl acetate (4 mL) and acetonitrile (one mL) and, after dissolved oxygen elimination by bubbling with nitrogen for 10 minutes, the vessel is sealed. The mixture is heated at 130°C for 3 hours to allow the reaction to proceed. After cooling the reaction vessel to room temperature, 2-hydroxyethyl methacrylate (0.352 mL, 364 mg, 2.80 mmol) is added and, after sealing, the reaction is allowed to proceed at 80°C for 2 hours. The reaction mixture is diluted with ethyl acetate (20 mL), and the filtrate is washed with three portions of

10% hydrochloric acid and with one portion of brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 4.11 g (82%) of a hydroxyl-terminated poly(n-butyl acrylate) having the formula shown below. The polymer has a number average molecular weight of 5,900 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.45. Its ¹H NMR analysis showed that the polymer contained, on an average, 3.2 hydroxyl groups per molecule.

Page 65, after line 50, kindly insert the following:



Page 65, kindly delete the extraneous material at the bottom of the page below the page number.

Page 66, kindly replace the paragraph encompassing lines 24-43 as follows:

A 50-mL pressure reaction vessel is charged with n-butyl acrylate (10.94 mL, 9.78 g, 76.3 mmol), the hydroxyl containing initiator obtained in Production Example 4 (301 mg, 1.53 mmol), cuprous bromide (219 mg, 1.53 mmol), 2,2'-bipyridyl (476 mg, 3.05 mmol), ethyl acetate (8.8 mL) and acetonitrile (2.2 mL) and, after dissolved oxygen elimination by bubbling with nitrogen, the vessel is sealed. The mixture is heated at 130°C for 1.3 hours to allow the reaction to proceed. The reaction mixture is diluted with ethyl acetate (20 mL), and the filtrate is washed three times with 10% hydrochloric acid and once with brine. The organic layer is dried over Na₂SO₄, and the solvent is distilled off under reduced pressure to give 5.23 g (53%) of a poly(n-butyl acrylate) having a hydroxyl group at one end. The polymer has a number average

molecular weight of 3,400 (polystyrene equivalent) as determined by GPC, with a molecular weight distribution of 1.31. Its ¹H NMR analysis showed that the polymer contained, on an average, 1.09 hydroxyl groups per molecule.

Page 67, kindly replace the paragraph encompassing lines 23-29 as follows:

Each mixture is degassed under reduced pressure, then poured into a mold, and cured by heating at 80°C for 15 hours. A portion of the cured product obtained is immersed in toluene for 24 hours. The weights before and after immersion are measured and the gel fraction is determined based on the change in weight. The results thus obtained are shown in Table 7.

Page 68, kindly replace the paragraph encompassing lines 5-18 as follows:

A 100-mL reactor is charged with n-butyl acrylate (20 mL, 1.79 g, 0.140 mmol), diethyl 2,5-dibromoadipate (0.628 g, 1.74 mmol), cuprous bromide (225 mg, 1.57mmol), pentamethyldiehtylenetriamine (0.328 mL, 0.272 g, 1.57 mmol), and toluene (2.0 mL). After carrying out freeze degassing, the reactor is purged with nitrogen. The mixture is heated at 70°C to allow the reaction to proceed for 45 minutes. At this time, the conversion rate of the monomer is 82%. The reaction mixture is diluted with ethyl acetate, and then the solution is passed through an activated alumina column for removing copper catalyst to obtain a bromine-terminated poly(n-butyl acrylate). The polymer obtained has a number average molecular weight of 10,200 and a molecular weight distribution of 1.44.

Page 68, kindly replace the paragraph encompassing lines 19-27 as follows:

In N,N-dimethylacetamide (10 mL) are mixed the poly(n-butyl acrylate) obtained (5.00 g) and sodium 4-hydroxybutanoate, and the solution is stirred at 70°C for 3 hours. The reaction solution is diluted with ethyl acetate and washed with water. The volatile matter of the organic layer is distilled off under reduced pressures to obtain the polymer having hydroxyl groups at both ends. Its ¹H NMR analysis showed that the polymer contained, on an average, 1.66 hydroxyl groups per molecule.

Page 68, kindly replace the paragraph encompassing lines 30-40 as follows:

The poly(n-butyl acrylate) having hydroxyl groups at both ends as obtained in Example 26 is thoroughly mixed with a trifunctional isocyanate compound (Ipposha Yushi's B-45). The mixing ratio is such that the mole ratio between the hydroxyl group of the polymer and the isocyanate of the isocyanate compound amounted to 1/3. This mixture is degassed under reduced pressure, and cured by heating at 100°C for 24 hours. A portion of the cured product obtained is immersed in toluene for 24 hours. The gel fraction is 97% as determined based on the change in weight before and after immersion.